# BANGALORE ELECTRICITY SUPPLY COMPANY LIMITED

**"Selection of Service Provider for Sale of Smart Meters to prospective consumers on rate contract basis in retail outlets for arranging power supply to new connections (including temporary installations) along with Supply, Implementation, Commissioning of IT system for a period of 5 years & Maintenance of IT system for a period of 10 years in BESCOM Jurisdiction." vide Tender Enquiry No. BESCOM/2024-25/SE0193**

## DETAILED SCOPE OF WORK

## 1.0 Definition Of Terms

In these general conditions and specifications, the following expressions shall have the meanings herein assigned to them, unless there is something in the subject or context inconsistent with such meaning.

1.1 "**BESCOM"** shall mean the **BANGALORE ELECTRICITY SUPPLY COMPANY LIMITED,** which has jurisdiction over the area of works, and its successor if any.

1.2 "**Contract and Contract Documents**" shall mean and include the Instructions to Bidders, Detailed Scope of Work, and General Conditions of Contract, Special Conditions of Contract and Annexures.

1.3 "**Contractor**" shall mean the tenderer / bidder whether a Firm/ Registered company/ Partnership or an individual, whose tender has been accepted by BESCOM or by the Officer duly authorized on behalf of BESCOM, and who has entered into agreement with the BESCOM for due fulfillment of the Contract and shall also include legal Representatives, Successors and Assignees of the tenderer.

1.4 **"Successful Bidder**" shall mean the Bidder whose bid has been evaluated and accepted for the Award of Contract.

1.5 "**Owner"**/ **"Purchaser"** shall mean the **Bangalore Electric Supply Company Limited (BESCOM)** and shall include its Legal Representatives, Successors and Assignees.

1.6 "**Division**" shall refer to the respective O & M division office of the BESCOM directly in charge of the works.

1.7 '**Engineer**' shall mean the Officer appointed in writing by the **Owner** to act as Engineer from time to time for the purposes of the Contract and "**Engineer**" shall also include the Chief Engineer and/or Superintending Engineer and/ or Executive Engineer and /or Assistant Executive Engineer and / or Assistant Engineer of BESCOM.

1.8 The term '**Contract Price**' shall mean the lump sum Price comprised of Unit Price including all taxes and charges quoted by the Contractor in his Bid with additions and/or deletions as may be mutually agreed and incorporated in the Letter of Award, for the complete Scope of the Works.

1.9 "**Specifications**" shall mean the specifications annexed.

1.10 Words used in singular shall also include the plural and vice versa where the context so demands.

1.11 "**YEAR"** shall mean the financial year for various clauses referred in qualification.

1.12 "**Service Provider**" or SP shall mean the successful bidder/contractor appointed by BESCOM who shall deliver the entire end to end scope of the work upon execution of the Contract subsequent to the Letter of Award. Agency/Contractor/Firm shall also refer to Service Provider.

1.13 "**Smart Meter**" shall mean an AC static watt-hour meter with time of use registers, internal connect and disconnect switches with two-way communication capability. It is designed to measure the flow of forward (import) or both forward (import) &

reverse (export), store and communicate the same along with other parameters defined in relevant standards. It shall be remotely accessed for collecting data / events, programming for selected parameters to be provided by the distribution utility for supplying electricity to an installation / premises. (as defined in IS 16444 including any amendments issued or modifications to the same from time to time).

1.14 "**Communication"** shall mean the ability of Meter to communicate with Head End System (HES) and Meter Data Management System (MDM) on any of the communication technologies mentioned in IS16444 Part 1 (RF/ Cellular) in a secure manner. The selection of communication technology should be as per the site conditions and as per design consideration of SP to meet the performance as per agreed Service Level Agreements (SLAs).

1.15 **The Head End System (HES)/ "HES**" shall mean a System which is capable of acquiring meter data automatically avoiding any human intervention and monitor parameters acquired from meters.

The HES functions are:

- Acquisition of meter data on demand & at user selectable periodicity
- Two-way communication with meter
- Audit trail and Event & Alarm Logging
- Signals for connect & disconnect of switches present in smart meter
- Encryption of data for secure communication
- Maintain time sync with meter
- Capability of communicating with different make of smart meters

1.16 **Meter Data Management System (MDMS) / "MDM**" The Meter data management system is a very important component of AMI IT system and it acts as a central data repository for entire meter data. It also serves the function of facilitating data to all backend Utility systems such as Billing, GIS, OMS etc. in pre-defined formats to serve the respective function.

1.17 "**System Integration"** the system integrations shall mean end to end integration of Smart meters with HES, MDM, existing Billing system and other IT/ OT Systems of BESCOM.

1.18 "**Advanced Metering Infrastructure" or "AMI**" means an integrated system of Smart Meters, communication networks and MDMS that enables two-way communication between the utilities and consumer premises equipment. The functional blocks of AMI typically include HES — Head End System, WAN — Wide Area Network, NAN — Neighborhood Area Network, DCU — Data Concentrator Unit / Gateway and HAN — Home Area Network;

## 2.0 Contractor to inform himself fully:

2.1 The Contractor shall in writing get necessary clarifications by the Engineer in respect of the meaning of any of the conditions set forth in the Contract documents.

## 3.0 Scope of Work

### 3.1 **Introduction**

BESCOM – Bangalore Electricity Supply Company Limited is responsible for Power distribution in Eight districts of Karnataka (Bangalore Urban, Bangalore Rural, Chikkaballapura, Kolar, Davanagere, Tumkur, Chitradurga and Ramanagara). BESCOM covers an area of 41,092 Sq. Kms. with a population of over 207 lakhs.
The company has 4 operating Zones – Bangalore Metropolitan Area Zone(North), Bangalore Metropolitan Area Zone(South), Bangalore Rural Area Zone and Chitradurga Area Zone, 9 Circles, 32 Divisions, 147 Sub-divisions and 534 Section Offices.

#### 3.1.1 **Background:**

CEA vide Gazette notification dated 23.12.2019 has amended Regulation-4, "Type of Meters" under (Installation and Operation of Meters) Regulation, 2006 mentioning that "all the new Consumer Meters shall be provided with Smart Meters with prepayment feature." In addition to above, vide Commission's letter dated 01.03.2021, it was directed to implement Electricity (Right of consumers) Rules, 2020 dated 31.12.2020 issued by MoP under clause no. 5, Metering- (1) " No connection shall be given without a meter and such meter shall be the smart pre-payment meter or pre-payment meter" subject to approval of Commission.

With the advent of technology and introduction of smart meters (with inbuilt facility for remote disconnection and reconnection) Karnataka Electricity Regulatory Commission has notified the "Karnataka Electricity Regulatory Commission (Pre-paid Smart Metering) Regulations, 2024" dated: 06.03.2024. These Regulations shall be applicable to all categories of consumers (new and all existing consumers). Provided that availing power supply through a smart pre-paid meter shall be at the option of the consumer and these Regulations shall come into force from 01.04.2024.

#### 3.1.2 Present Scenario:

At present BESCOM has retail outlets through which single/three phase (whole current / CT operated) static meters are made available in designated retail outlets across O&M Divisions of BESCOM to sell the Static Meters for prospective consumers on rate contract basis for all type of installation of power supply.

Further as per the "Karnataka Electricity Regulatory Commission (Pre-paid Smart Metering) Regulations, 2024" dated: 06.03.2024, BESCOM intends to adopt Smart Metering System compulsorily for Temporary installations and **at the option of the** consumer for New Connections/existing connection.
As suite of IT Applications and System to support the Supply, Installation, Commissioning, Integration with existing IT application of BESCOM, along with maintenance of the system for the contract duration is envisaged.

It is further intended that the IT System and the O&M services proposed under this contract shall be scalable for the entire population/consumers of BESCOM. The Smart Meters along with the Communication, IT Applications and Infrastructure is termed also as Advanced Metering Infrastructure.

BESCOM intends to select the Service provider who would Supply, Install, Commission & Maintain the Smart Meters, Communication Infrastructure and IT Systems for the contract duration duly complying all the clauses in KERC (Pre-paid Smart metering) Regulations, 2024 and BESCOM Norms.

BESCOM shall allow the consumer to purchase the meter from its retail outlets, conforming to specified CEA Regulations/ Indian Standards, at their own cost and dispose of the existing meter, as per the existing practice in BESCOM, so as to avoid its misuse.

**The pre-paid smart meters shall communicate to BESCOM, all the metered data at least once in a day and an authorized representative of BESCOM shall physically read the meter once in every quarter**. The data regarding energy consumption shall be made available on real time basis, to the consumer, through website, mobile App or any other digital mode.

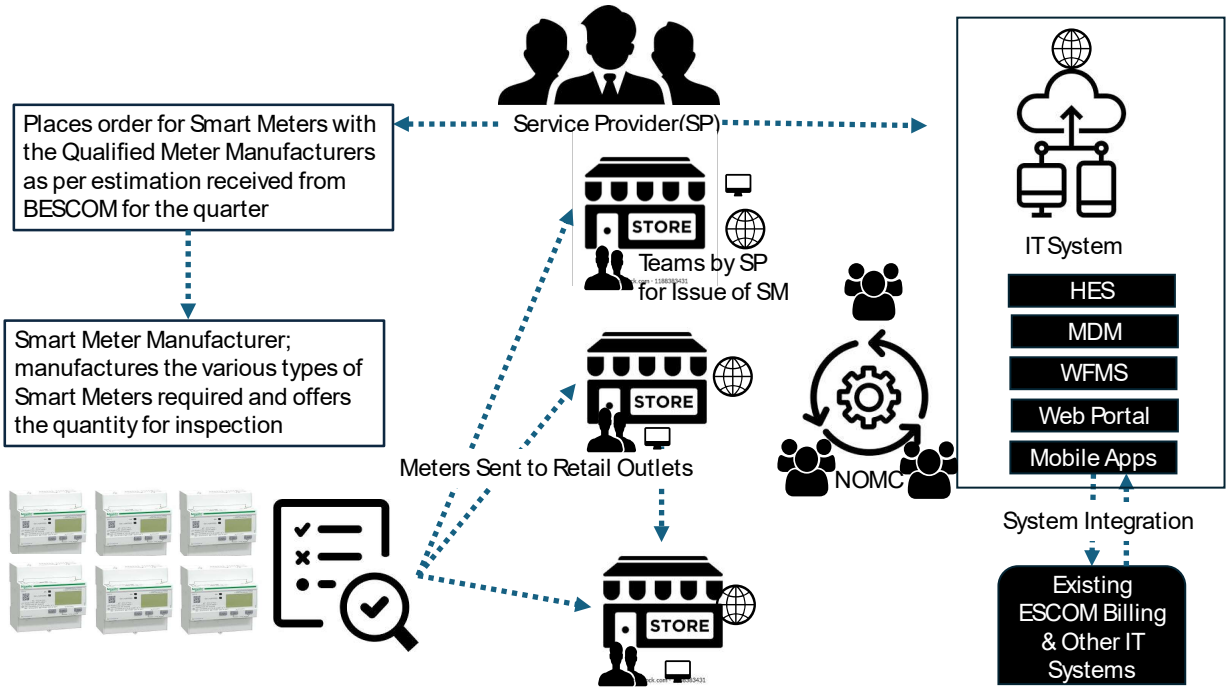
In case maximum demand recorded by the smart pre-payment meter exceeds the sanctioned load in a month, the bill, for that billing cycle, shall be calculated based on the actual recorded maximum demand and consumers shall be informed of this change in calculation through Short Message Service or mobile App: Provided that the revision of the Sanctioned Load, if any, based on the actual recorded maximum demand shall be as under: In case of increase in recorded maximum demand, at least three times during a financial year, the lowest of such increased monthly maximum demand, shall be considered as the revised sanctioned load, and the same shall be automatically reset from the billing cycle in next financial year as per KERC (Pre-paid Smart metering) Regulations, 2024.

## 3.2 High Level Scope of Work

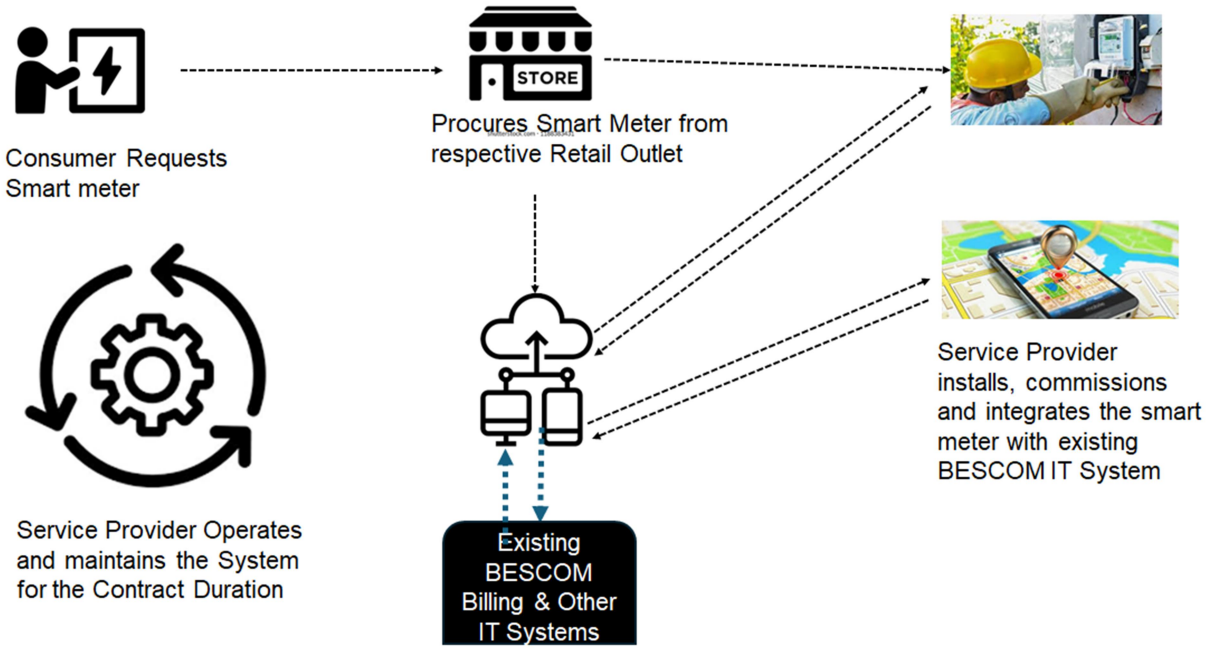
The Service Provider (SP) shall Supply, Commission, Integrate and Maintain Smart Meters, reliable Communication system, state of art IT applications along with the required cloud, IT infrastructure at various offices of BESCOM for enabling BESCOM to provide SMART METERS primarily to consumers through designated retail outlets for New connections, Temporary meters and any other type or category of consumers/System as directed by BESCOM/KERC from time to time.

It is noted that the various components and services mentioned would be elaborated in the subsequent sections, but any component/service that is not explicitly specified and is required for successfully fulfilling the intended scope of work shall be deemed to be part of scope of work and shall be provided by the services provider as the part of contract.

The following is the illustration of the system:


Service Provider(SP)
Places order for Smart Meters with the Qualified Meter Manufacturers as per estimation received from BESCOM for the quarter
Smart Meter Manufacturer; manufactures the various types of Smart Meters required and offers the quantity for inspection
STORE
Teams by SP for Issue of SM
Meters Sent to Retail Outlets
NOMC
IT System
HES
MDM
WFMS
Web Portal
Mobile Apps
System Integration
Existing ESCOM Billing & Other IT Systems

Process of Smart Meter Installation and Commissioning


Consumer Requests Smart meter
STORE
Procures Smart Meter from respective Retail Outlet
Service Provider installs, commissions and integrates the smart meter with existing BESCOM IT System
Service Provider Operates and maintains the System for the Contract Duration
Existing BESCOM Billing & Other IT Systems

### 3.2.1 Supply of Smart Meters:

The Service Provider shall supply Single phase, three phase whole current and three phase LT-CT operated Smart Meters for prospective/existing consumers on rate contract basis in retail outlets. The detailed specification of the Smart Meters is specified in Annexure A. However, the Service Provider shall sell pre-paid smart meters to the consumers conforming to the technical requirements of relevant standards/regulations/ guidelines of KERC/CEA, as amended from time to time.

Pre-paid smart metering system shall have facility for recharge of the amount in the consumers' account through online such as mobile App, Credit / Debit Cards, web application or digital payment systems (e-wallet / wallet, web portal) etc., on real time basis and also send notification to the consumer on registered mobile phone, in case of minimum/insufficient amount.

The Smart Meters shall be guaranteed for 5 years from the date of supply or date of commissioning whichever is earlier.

A quarterly projection/estimation of the various types and category of the requirement of Smart Meters shall be communicated to the service provider, however the service provider must ensure that sufficient stocks (equivalent to clause in SLA thrice the average no. of meters required per month) are always maintained in the retail outlets during the contract tenure

The Service provider shall also maintain Inventory management dashboard for providing details of category wise number of meters sold daily, monthly and annual basis including opening balance and closing balance details with respect to the meters. Also, the dashboard has to display the actual meter stock available in other retail outlets in the vicinity.

The Smart Meters supplied should have provision to operate on various communication modes i.e., Cellular/ RF/ reliable communication mode as required as per relevant standards for meter data transfer complying with the relevant Standards / Regulations regarding cyber security.

The pre-paid smart meter shall have adequate number of registers and the facility for Time of Day (TOD) and kVAh based tariff application: Provided that the prepaid smart meters shall have swappable communication port with sealing arrangement suitable for different communication technologies. The AMI software application shall enable auto reconnection after successful recharge of the meter so that the connection is automatically restored.

**3.2.2** Smart Meters to be supplied with communication Network Interface Card (NIC) suitable for available frequency bands (Unlicensed Band in case of RF) in India. The

Communication NIC should be designed in such a way that it would work for the project duration even if there are changes in cellular modes/cellular network configuration and shall meet SLA requirements as defined in Annexure F. It would be the responsibility of Service Provider to supply the communication technology thoughtfully to avoid technology obsoleteness during project and subsequent extensions.

**3.2.3** The Service Provider has to open the retail outlets in each division as indicated in Annexure C, across the BESCOM and maintain sufficient stocks. Depending upon the availability, BESCOM will provide the required space and facilities for storing the Smart Meters. In case of non-availability of space at BESCOM Division, the Service Provider shall set up outlet in the Headquarter of that concerned O&M Division office of BESCOM. However, Monthly rental price per sqft for setting up of such Smart meter outlets at C, O&M Divisions of BESCOM shall be paid by BESCOM at the awarded price.

**3.2.4** Each Retail Outlet shall be equipped with two no. of skilled and two no. of semiskilled manpower and computers which are connected to the IT system for indicating the material availability, inventory, issue and other details. Monthly Salary for the manpower shall be arranged by Service provider and invoice for the same shall be submitted to BESCOM on monthly basis.

**3.2.5** The smart meters duly tested as per IS and sealed by MT sealing sections of BESCOM, packed in a card board container will be sold to the consumer along with relevant documents like (i) Test certificate issued by the MT section of BESCOM (ii) Guarantee card along with (iii) cash receipt by manufacturer during sale of smart meter at the retail outlet indicating the serial no. of the smart meter. The smart meter should be distinctively different with a nameplate of different base color and stating that it is consumer purchased smart meter.

**3.2.6** The Asst. Executive Engineer (Ele.)/Concerned designated authority, of the division/sub-division will issue a letter to facilitate the purchase of Smart Meter by the consumer as per the requirement of BESCOM.

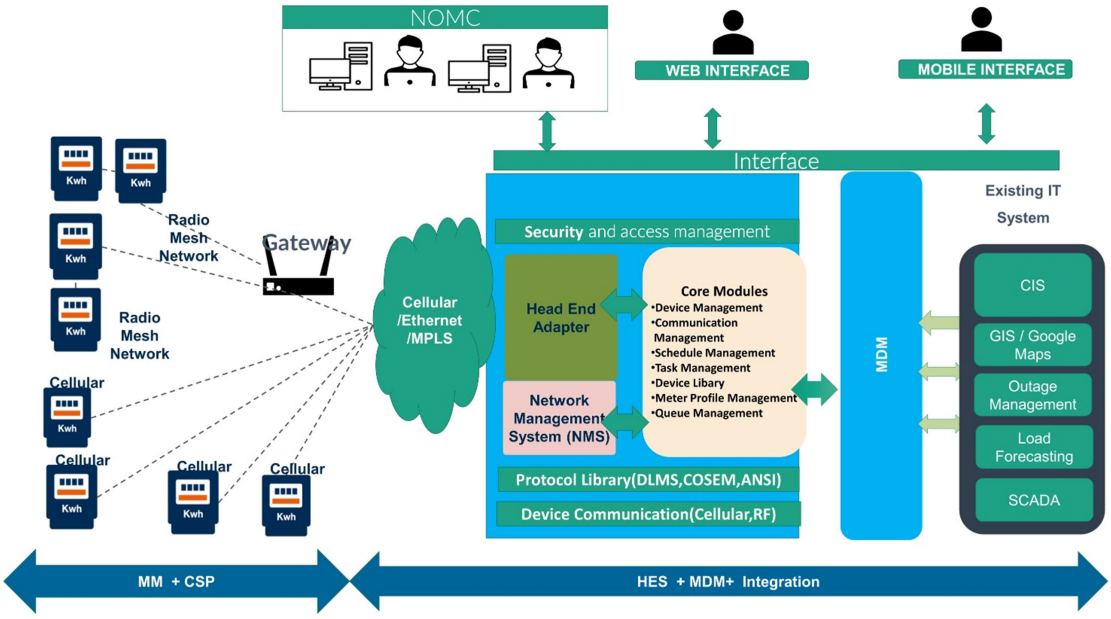
**3.2.7** The consumer will purchase the specified smart meter from the identified/ authorized Smart Meter service provider's retail outlet, duly producing the letter given by Asst. Executive Engineer (Ele.), of the subdivision. The Service provider has to maintain Movement Register at each Outlet mentioning details of no. of meters sold on daily basis along with other necessary information. He shall also submit monthly statistics to concerned C, O&M Division offices of BESCOM and consolidated report to Corporate office.

**3.2.8** The smart meters shall be installed, configured and commissioned by the service provider. (The Electrical Connection of Service mains to consumer premises have to be arranged by the consumer). The GPS co-ordinates, the smart meter details, old meter details (in case of replacement) along with the photos of installation, shall be captured and

uploaded vide mobile app. The service provider shall ensure that the cellular network coverage is available and may switch between various cellular service providers so that the Smart Meter installed shall communicate uninterruptedly. The New Connection meter installation guidelines shall be followed and Smart Meters should be installed at an accessible location and the commissioning details vide IT application be made available to BESCOM NOMC system.

**3.2.9** The service provider shall establish a cloud-based IT system consisting of Head End System, Meter Data Management, Work Force Management System, Web Portal, Mobile Applications, etc., as specified in Annexure D. The System shall be integrated with the existing IT systems of the BESCOM on standard interfaces. The details of the integration with the BESCOM existing IT systems shall be finalized with the successful period, the service provider should not only integrate with the existing systems but also integrate with future systems that BESCOM may deploy during the contract tenure.
The system shall provide configurable options to operate smart meter on Pre-Paid / Post Paid mode on need basis as required by BESCOM either on a category basis, specific connection type or any other criteria as specified from time to time during the contract period. The conversion process from postpaid to prepaid or vice versa shall be provided by BESCOM to the successful bidder.

**3.2.10** The service provider shall establish a NOMC (Network Operation & Monitoring Center) at BESCOM headquarters with a support team and IT infrastructure for operating and maintaining the Smart Metering system. The details on the Hardware, Manpower and Connectivity are specified in Annexure E. The NOMC shall be scalable as the cumulative installations increase over the contract duration.



**3.2.11** The Smart Meters and the IT system should be commissioned and maintained by the service provider for the contract duration. The SLA's to be maintained are specified in Annexure F.

**3.2.12** The Service provider has to train the BESCOM officers on the system as per the requirement intimated at later stages.

**3.2.13** The sale of Smart meters can be extended to existing consumers voluntarily opting for Smart Meters, Defective/Burnt meter replacement, solar net metering and any other category of consumers shall be made duly collecting charges from the consumers as per BESCOM/KERC directions.

**3.2.14** The estimated Quarterly quantity of various category of Smart Meters shall be informed to the service provider at the start of the respective quarter. After considering the usage in the previous quarter, O&M Divisions/ Subdivisions can place order for smart meters at the rate contract rates for carrying out replacement and any other ad hoc or specific requirements.

**3.2.15** If BESCOM intends to bring any other Smart Meters that they have installed/going to install into this system, the same shall be provisioned by the Service Provider. The service provider will be paid for the IT System & O&M recurring fee for these meters. BESCOM will facilitate the integration requirements. The IT system should be scalable and configurable to accommodate the entire BESCOM population if desired.

**3.2.16 Integration with Existing IT System**:

- HES & MDM modules shall be checked and certified by the officers authorized for existing Billing applications of BESCOM.
- Sale of Smart meters and integration of the same with existing IT system shall commence within three months from the date of issue of DWA.
- First smart meter sold should be integrated to BESCOM IT and made to communicate bi-directionally incorporating all the features as per the DWA within 3 months from date of issue of DWA and further smart meters sold shall be brought to service not later than three days .
- All APIs integration with existing IT applications of BESCOM shall be completed within three months from the date of issue of DWA.
- Notwithstanding anything stated above BESCOM reserves all the rights to take actions including termination of contract if circumstances so warrants.

### 3.3 Billing of electricity charges

The pre-paid smart meter billing system shall have the provision for ensuring recovery of fixed charges, Fuel & Power Purchase Cost Adjustment (FPPCA) charges, Time of Day (ToD) tariff and the energy consumption charges, taxes or any other applicable charges, as per the applicable tariff schedule / specific orders of the Commission. The software solution provided for pre-paid smart meter billing shall be capable of implementing the tariff as per tariff orders approved by the Commission from time to time.

At the time of availing prepaid metering facility, the consumer shall pay minimum amount equivalent to the monthly fixed/demand charges plus energy charges as per consumers' requirement at the prevailing tariff rates. The consumer may recharge the energy charges as and when required in multiples of Rs.100/-, subject to a minimum amount equivalent to one week's average consumption as recorded in the immediately preceding week/month. There shall be no maximum limit for recharge amount. Provided that in case of newly serviced installations where previous average consumption of at least one week is not available, the consumption charges shall be computed for one week based on the burning hours' basis as provided in the "Conditions of Supply of Electricity of Distribution Licensees in The State of Karnataka / Regulations / Codes / Orders of the Commission."

The computation of the energy charges shall take place on a daily basis, as per tariff schedule / specific orders of the Commission. The energy charges as per actual consumption shall be deducted on a daily basis from the amount paid by the consumer. The monthly fixed charge shall be deducted at the beginning of the calendar month. Thereafter the next recharge by the consumer shall be for a minimum amount of monthly fixed charges and energy charge as per his requirement. In case the balance of energy charge is less than the full fixed charge the supply should be disconnected automatically. Further, in case the energy charges deposited by the Consumer are more than monthly fixed charges, there should be automatic transfer of amount from energy charges to monthly fixed charge account. Thereafter, in case the balance of energy charges is less than 75% of the weekly energy charges, communication shall be automatically sent to the consumer to pay the weekly energy charges.

### 3.4 Replacement of meters

In case the pre-paid smart meter gets damaged or burnt out the same shall be got tested at the BESCOM's meter testing lab or any NABL accredited labs. In case the reasons for the pre-paid smart meter getting damaged/ burnt out is attributable to the consumer, the same shall be replaced at the cost of the consumer. If the reason is attributable to the system constraints, the burnt out prepaid smart meter shall be replaced immediately at the cost of BESCOM.

### 3.5 Additional Scope of Supply

The Service Provider has to build the Advanced Metering Infrastructure that is deployed including the Smart Meters, IT Systems etc, so that in the event BESCOM intends to utilize the same system for its future Smart Meters, the system shall be scalable and capable.

**Sd/-**
**General Manager(Ele.)**
**DAS, SG & TIC**
**BESCOM**

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